Introduction

Lexical acquisition is the process by which children form representations for new words in their lexicon. This involves two main events: the encoding of a (modality-specific) word form (e.g, phonology, orthography, signed form) and its association with the semantic features of its referent (**???**). Lexical acquisition starts at early ages: infants as young as 6 months of age look longer to a named picture than to an unnamed picture presented next to it, demonstrating both (a) recognition of a word-form and (b) association with its (visual) referent (**???**). At 7.5 months, the phonological representations of familiar words seem to be quite detailed, as infants show evidence of recognition when the whole word is uttered (**???**), as opposed to when only part of the word is uttered. At 12 months, infants show sensitivity to both vowel and consonant mispronunciations (**???**), looking shorter to named pictures when their label is mispronounced. Remarkable as it is, the phonological specificity of infants' lexical entries is only the foundation of following developmental milestones. One of them, central to this study, is the emergence of excitatory and inhibitory links between word representations, which represents one of the essential characteristics of the adult lexicon (**???**).

Words are not learnt in isolation, but rather in contexts rich in speech tokens and referents. The structure of toddlers' lexicon reflects this high connectivity (**???**; **???**; **???**). At 18 months, infants' recognition of spoken words is sensitive to phonological priming effects, suggesting that their lexical entries are phonological linked, and co-activated during speech processing (**???**; **???**). The emergence of semantic links in the developing lexicon occurs somewhat later, at 24 months of age, when infants show sensitivity to semantic priming (**???**; **???**; **???**), and show evidence of inhibitory links between lexical-semantic entries (**???**). By 24 months, toddlers' recognition of familiar words also seems to follow a hierarchical fashion, as revealed by their sensitivity to the phonology and semantic similarity of distractor pictures presented along the named picture: the interference of phonological distractors is stronger at earlier stages of spoken word recognition, that of semantic distractors is stronger at later stages (**???**). Vocabulary size predicts the emergence and the strength of these effects: 18 months-old toddlers are sensitive to semantic priming and interference too, provided they know a similar amount of words (**???**; **???**), and the strength of the phonological and semantic distractors during spoken word recognition grows stronger along the vocabulary size of the toddlers. This suggests that the emergence of rich lexical networks – both at the phonological and the semantic levels – grows as a function of the number of words acquired by the toddler.

The structure of the lexicon also impacts the order of acquisition of new words. Words that share a high degree of phonological and/or semantic overlap with words already acquired are more likely to be acquired next (**???**). (**???**) and (**???**) showed that the connectivity of a given semantic category (i.e., animals) in a child's lexicon predicts a better performance in a disambiguation task, where participants are presented with a novel label in the presence of a familiar and a novel object: infants show stronger looking preference for the novel object if it belonged to a category for which many words had already been acquired. This points to the structure of the lexicon facilitating the strategies children engage during word learning.

The case of bilingual children (here defined as those learning two languages from birth) presents an opportunity to study how lexical acquisition takes placed under a more complex environment, as they face the challenge of learning two distinct sets of words – one for each language – that partially overlap in sound and meaning.

EARLY STAGES IN BILINGUAL LANGUAGE ACQUISITION

When compared to their monolingual peers, they know fewer words only when just on language is considered (e.g., English monolinguals know more words in English than English-Spanish bilinguals). When both languages are taken into account, bilingual children seem to know, at least, as many words as monolinguals do (Ben-Zeev, 1977; Bialystok, Luk, Peets, & Yang, 2010; Blom et al., 2019; Core, Hoff, Rumiche, & Señor,

2013; Doyle & others, 1977; Fernandez, Pearson, Umbel, Oiler, & Molinet-Molina, 1992; Hoff et al., 2012; Hoff, Rumiche, Burridge, Ribot, & Welsh, 2014; Pearson & Fernández, 1994; Rosenblum & Pinker, 1983; but see Pearson, Fernández, & Oller, 1993; Houwer, Bornstein, & Putnick, 2014).

The vocabulary size of

Previous studies have highlighted

Previous studies point to bilinguals' vocabulary size as a function of the degree

Floccia et al. (2018), gathered parental vocabulary estimates (Hamilton, Plunkett, & Schafer, 2000) from a large sample of 24-month-old toddlers learning English and an additional language (from a pool of 13 linguistically diverse languages). They computed the average phonological similarity between translation equivalents (TEs from now on; e.g., *table* in English and *tafel* in Dutch) for each pair of languages, and found a positive association between this measure of phonological similarity and participants' productive vocabulary sizes in their additional language. Using a similar measure of lexical similarity, Blom et al. (2019) extended these results to bilingual children aged three to 10, and reported a positive association between the lexical distance and comprehensive vocabulary size: bilinguals learning lexically close languages showed similar vocabulary sizes to those of monolinguals, but those learning the more distant languages showed lower vocabulary sizes.

These results suggest that linguistic distance between languages plays an important role during bilingual lexical acquisition, and that this effect operates within TEs. What mechanisms underlie this effect, and why they seem to operate differently across comprehension and production, or across the dominant and the non-dominant language, remain open issues. Floccia et al. (2018) pointed to parallel activation as a candidate mechanism behind this facilitation effect. The parallel activation principle suggests that bilinguals activate lexical representations in a language non-selective way: during the comprehension or production of a word in one language (e.g., *cat*, in English) its corresponding translation in the other language is activated too [e.g., *gato*, in Spanish. There is a vast body of evidence supporting language non-selective lexical access in both adults (e.g., Dell & O'Seaghdha, 1991; Bobb, Von Holzen, Mayor, Mani, & Carreiras, 2020; Costa & Caramazza, 2000; Dijkstra, 2005; Hoshino & Kroll, 2008; Kroll, Gullifer, & Rossi, 2013; Singh, 2014; Spivey & Marian, 1999; Thierry & Wu, 2007; Von Holzen, Fennell, & Mani, 2019; Yudes, Macizo, & Bajo, 2010; see Costa, Santesteban, & Caño, 2005 for review), and children (e.g. Von Holzen & Mani, 2012; Bosma & Nota, 2020; Jardak & Byers-Heinlein, 2019; Poulin-Dubois, Bialystok, Blaye, Polonia, & Yott, 2013). A critical implication of parallel activation is that the word form (i.e., phonology, orthography, etc.) of both translation equivalents are available to each other, impacting the comprehension or production dynamic of any of them.

Floccia et al. (2018) argue that the degree of phonological similarity between TEs (*cognateness* from now on) of both languages should lead to increased parallel activation of both languages during language exposure, facilitating the acquisition of words in both languages, and leading participants leading two lexically close languages to show larger vocabulary sizes than those learning two lexically distant languages. This account, however, neglects the fact that for parallel activation to take place and play a facilitation role, lexical representations of both pairs of the TE must have been already established in the lexicon, and their corresponding phonological forms must have been encoded. This is not the case during lexical acquisition, where at least one of the members of the pair has not being acquired yet. A more lenient definition of parallel activation could adjust to the context of lexical acquisition more easily: when only one of the members of the TE has been acquired, its lexical representation is activated when, in the presence of its referent, a phonologically similar label is uttered. Consider the case of a Catalan-Spanish bilingual that has already learned the word *gat* (Catalan for *cat*), but not *gato* (in Spanish). It is possible that, when presented with *gato* in the presence of a cat, she maps this novel label to the familiar word *gat*, and creates a lexical representation for *gato* as a synonym for *gat*. The case of a non-cognate is differing. Consider now the case of a toddler that has already learnt *gos* (Catalan for *dog*), but not *perro* (Spanish). In this case, it would not be possible to map both labels via phonology, give their lack of phonological similarity.

Under this account, cognates (i.e., phonologically similar TEs) would be acquired earlier than non-cognates, but this effect would only play a role once one of the members of the TE has been acquired. The evidence supporting an earlier age of acquisition of cognates relative to non-cognates if sparse. Schelletter (2002)'s

reported a longitudinal case-study of a German/English child who produced cognate TEs earlier than non-cognate TE. Bosch & Ramon-Casas (2014), showed converging results from a sample of 48 monolingual and bilingual infants aged 24 months. The low number of words included in the analyses of both studies, and the lack of adjustment for lexical frequency, limits severely the strength of any conclusions concerning the difference in age of acquisition of cognates and non-cognates. On the other hand Floccia et al. (2018) worked with aggregated estimates of participants' vocabulary size, losing item-level information that could provide information about change in age of acquisition of TEs associated with their degree of phonological similarity. Therefore, their results can only be considered as compatible with cognateness playing a role on age of acquisition. In this study, we aimed at overcoming these pitfalls by using unaggregated data from individual responses, testing the role of cognateness explicitly and adjusting for lexical frequency.

It also follows from the fact that cognateness operates *within* TEs that the effect of cognateness can only play a role once one of the members of the TE has been acquired, and its phonological form is available during the acquisition of its translation. Words that belong to the language of most exposure (dominant language) are likely to be acquired earlier than words in the non-dominant language (Floccia et al., 2018). (**???**) tested Dutch-Frisian bilingual children aged 2.5 to four years in a comprehension task (PPVT-NL) that involved Frisian words with different degrees of phonological similarity with their Dutch TE. Infants with lower exposure to Frisian showed a better performance for words with high similarity, while no such benefit was found in children who were exposed mostly to Frisian. This suggests that infants that were mostly exposed to Dutch used the phonology of dutch words when processing Frisian words, as revealed by a better performance for cognates than for non-cognates. A study by (**???**) showed that the degree of phonological similarity between the performance of was better for cognates than for non-cognates, only for those children

to have a larger compr Therefore, we predicted that the effect of cognateness should, on average, impact more strongly the acquisition of words in the non-dominant language, relative to words in the dominant language.

Finally, previous studies have reported that the properties that describe the form of a word play a stronger role in production than comprehension than in production. This is the case of the number of phonemes (Braginsky, Yurovsky, Marchman, & Frank, 2019), phonological neighbourhood density (Jones & Brandt, 2019). These results converge with Floccia et al. (2018)'s finding that the effect of the average cognateness between languages was larger in production than in comprehension[1]. Accordingly, we expected the role of cognateness to be more central in production than in comprehension.

In summary, we investigated the effect of cognateness on the probability of acquisition of TEs, and predicted that (1) cognate TEs are acquired earlier than non-cognate TEs, that this effect will be larger in the dominant than in the non-dominant language, and larger in production than in comprehension.

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